Corps of Engineers
Columbia River Channel Improvement Project
Original Review Panel Comments and Benefit Review Team Opinions on Responses
January 10, 2003

Background

The Corps convened a group of technical experts in August 2002 to review the benefits analysis in the Draft Supplemental Integrated Feasibility Report for Channel Improvements and Environmental Impact Statement (DSDSIFR/EIS). The reviewers were asked to evaluate (1) the reasonableness of the assumptions and overall conclusions of the benefits analysis of the 43' channel, and (2) whether the data were used properly in the overall analysis. The Review Panel also felt that an important goal of its work was to improve the analysis, exposition, and insight of the report. A report summarizing the technical review process and the results was completed by the review team and provided to the Corps September 9, 2002. The Corps has developed responses to the benefit review team comments, and has prepared a revised analysis of economic benefits incorporating the responses and acting upon the proposed issue resolution steps.

The objective of further input from members of the benefit review team was to determine whether or not the Corps has prepared satisfactory responses to the technical review comments in the September 9, 2002 review report.

The panel therefore reviewed two Corps documents:

- *Corps Responses to Benefit Review Comments in September 9, 2002 report*
- *Columbia River Channel Improvement Project Final Supplemental Integrated Feasibility Report and Environmental Impact Statement, Exhibit M, Economic Analysis (Revised)*

The review opinions are therefore based on the responses to comments and the descriptions of analytic methods presented in the two Corps documents. The panel did not review the details of benefit calculations, nor did the panel review cargo projections, spreadsheets, or other backup documentation.

To maintain clarity and continuity, this document is structured to reflect the description of original panel comments contained in the Crops responses.

Summary Review Opinions

The analysis has been improved overall, with additional research and analysis evident and a number of useful refinements. The sensitivity analysis is more complete and informative. Many of the September panel comments have been addressed satisfactorily.

Overall, the panel members are satisfied with the reasonableness of the assumptions and overall conclusions of the benefits analysis of the 43' channel, and that the data were generally used properly in the overall analysis. The cost-side reductions have resulted in a substantial cost-benefit cushion, and the outstanding issues with the benefit analysis

would not appear to jeopardize the overall cost-benefit balance. The revised estimates of economics benefits appear to be a sufficient basis for a decision on overall project justification.

The remaining issues of potential consequence include:

- claimed benefits for light-loading vessels;
- the inherent dilemma of service frequency versus vessel utilization benefits; and
- the analysis of empty container flows.

The panel believes that the first issue – benefits to light-loading vessels – should have been analyzed differently, and should have been subjected to a sensitivity analysis as stated in the Corps' Response to Review Panel Comments. This is the one area in which the panel feels that the reasonableness of the assumptions and the use of data remain questionable. The elimination of benefits to light-loading vessels, however, would not appear to change the overall cost-benefit conclusion.

The other issues are less clear, and may be intractable within the scope of the Corps' analysis. All are addressed in greater detail in the sections that follow.

The Corps has also not dealt with the issues raised regarding the distribution of benefits, the likelihood and impact of rate changes, and the definition of National Economic Development benefits in this context. The panel agrees that those issues are beyond the authority of the Portland District and beyond the mandated scope of the Columbia River analysis.

It is still incumbent on the Corps, of course, to develop the best analysis and explanation possible for the benefits estimates. Both cost and benefits estimates are subject to change as events unfold, and subsequent increases in the cost estimates could narrow the margin, making accurate benefits estimates more critical.

It appears to the panel that the time and effort spent in revising the economic analysis could have been largely avoided had an external technical review taken place earlier in the process. Moreover, had an external review indicated the need for a multi-port analysis at the outset, such an analysis could have been completed without backtracking.

Original Panel Comments and Review Opinions

For each topic, the sections below present the original panel comments and the panel's review opinions.

1. Original Panel Comment. *Multi-port Analysis.* Although apparently reasonable at the time, the absence of a multi-port analysis is no longer reasonable in light of recent information. The scope of a broader analysis would encompass the complexity of the container shipping market and container vessel operations, and the role of Portland as a last-call, riverine port with niche export cargo.

Review Opinion. The need for a multi-port analysis has been dismissed too lightly, and has repercussions for the underlying logic of the benefits estimate. The response assertion that "a multi-port analysis would inevitably result in higher project benefits" cannot be supported without actually doing the analysis at some level of detail, despite the considerable effort the Corps put into related information and discussions.

There is apparently a problem in that "multi-port analysis" has a very specific meaning to the Corps, and that a "regulation" multi-port analysis is a large undertaking. *The review panel is generally agreed that the results of a "multi-port analysis" would be unlikely to tip the cost-benefit scales.* The Portland District may be understandably reluctant to invest substantial resources and time in an analysis that would not tip the cost-benefit balance.

The elimination of claimed "mid-port call" container shipping benefits is appropriate given the lack of strong data, and does reduce the need to examine multi-port issues.

On the other hand, the Corps has ventured into multi-port issues by considering Portland's cargo capture (from Tacoma) and benefits to non-Portland cargo (mostly from Tacoma). Moreover, the Corps has assumed that there would be no cargo growth in large part to avoid a multi-port analysis, and that assumption leads to an inescapable analytic dilemma described under a subsequent heading.

In its discussion of multi-port issues, the review panel gave the following list. The Corps has responded to this list with mixed success.

- *alternative interpretations of current and historical cargo flows and routing decisions in determining percentages of cargo captured from the Portland hinterland with and without the project*

The Corps' response focused on the capture rate, without any in-depth discussion of customer routing decisions.

- *the perspectives of hinterland shippers and consignees on assumptions and forecasts*

The Corps' response focused on potential changes in shipper behavior, which was not the issue. The panel was more concerned with a reality check of the cargo projections and relevant assumptions (e.g., no cargo growth) from actual shippers and consignees.

- *the views of shipping lines that do not presently call Portland on vessel operations and fleet composition scenarios*

This issue was not addressed.

- *the perspectives of competing ports and the impact and extent of their expansion or improvement plans;*

There was a brief direct response to this issue that addressed the potential of competitive response only within the context of rate actions, which is too limited. A more complete

and adequate response is contained in the sensitivity analysis on page 43 of the revised economic benefits report.

- *the history of vessel delays and their underlying causes*

This issue was adequately addressed by providing estimates on the size of delay benefits, which turned out to be minimal

- *past and projected ratios of empty and loaded outbound containers*

The data and quantitative information offered in response were minimal, and as noted under a later heading, the empty container issue remains unresolved.

- *the full logistics costs for container vessels, including potential in-port vessel size diseconomies, instead of relying solely on sailing and in-port transportation costs*

The response indicates that the Corps does not believe there are potential diseconomies of scale in port handling of larger vessels. (This information is attributed to a Port of Portland representative.) Panel members are aware of studies that suggest different conclusions, although citations could not be gathered in the limited review timeframe. Revised container fleet projections (Table 28 of the revised economic analysis) anticipate a shift to larger vessels between 2007 and 2017, so the issue is worthy of mention. The panel agrees, however, that Port scale diseconomies would not alter the total benefits or the cost-benefit ratio significantly.

- *a trade flow/multi-port analysis for bulk commodities, which would include cargo handling and storage capacities, which may reveal additional benefits*

The Corps agrees that there are uncounted benefits that could be identified through a multi-port analysis for bulk commodities. The panel observes, however, that here again the impact on total benefits and cost-benefit ratio is likely to be small.

The Corps has not, in fact, resolved all the issues raised in the context of a multi-port analysis, but these issues would not appear to have a direct material effect on project justification. As becomes apparent in subsequent comments and opinions, however, the assumptions and analytic steps the Corps has taken to avoid a multi-port analysis have created internal dilemmas and potential contradictions in the benefits estimates. A far better approach would have been to undertake the multi-port analysis from the beginning and strengthen the whole methodology.

2. Original Panel Comment*. Lack of Cargo Impacts.* The Corps assumed the same container cargo growth "with project" and "without project." Panel members expect that cargo would increase faster with channel deepening, but a more detailed, multi-port analysis is needed to determine how much increased cargo would be induced by channel deepening.

Review Opinion. The revised benefits estimate remains generally conservative, with no induced cargo and a declining "capture rate" for the Port of Portland's container cargo hinterland. The justification for a no-growth approach in the Corps' response to

comments does not resolve the issue. The panel remains convinced that some cargo growth will occur as a result of the channel deepening, and that the revised analysis does not capture this impact. The estimated 65.6% current capture rate may be too high as a starting point for the analysis, and a lower starting point might have resulted in a projection of modest cargo growth. Moreover, the decision by a carrier to start or discontinue direct Portland calls can have an immediate and significant impact on he capture rate. Such additional cargo growth, however, is unlikely to materially affect the cost-benefit ratio.

It appears to the panel that the no-growth assumption has been maintained in large part to avoid the need for a multi-port analysis. As discussed below, however, the no-growth assumption forces the economic analysis into a complex dilemma regarding empty container flows, vessel utilization, and service frequency. The conservatism may therefore be misplaced.

3. Original Panel Comment*. Vessel Capacity Limits.* There is a pervasive assumption in the Corps and Port studies that containerized cargo growth at Portland is limited only by vessel capacity.

Review Opinion. There is still a pervasive assumption/assertion that the Portland trade is under-tonnaged, with the implication of latent demand for more vessel capacity.

> "*Some shippers are unable to ship their product through Portland due to capacity constraints. Portland will always tend to be an under-tonnaged market, meaning there will almost always be less capacity than demand.*" (Corps response, page 4)

If that were the case, then the implicit light-loading vessel argument that vessel operators were doing their best to maximize loads up to a target draft (but occasionally failing due to non-cargo factors) would make more sense. The under-tonnaging assumption, however, has yet to be supported with data or analysis. In the absence of support for that assertion, it would seem more plausible that there was simply not enough export cargo to fill the vessels and take advantage of the available draft.

Moreover, it is difficult to believe that the Portland market was so undertonnaged previously that the recent increase from two container services to three <u>still</u> leaves inadequate capacity and excess export cargo year-round. Figure 8 of the revised economic analysis shows that the 1Q2002 average departure draft for container vessels was a bit less than 37 feet, versus an average design draft of nearly 41 feet and a reported departure draft target of 38 feet. It is apparent, then, that the vessels are not using their full capacity for export cargo. Finally, if there is unmet demand for additional vessel capacity, a no-growth assumption for additional vessel capacity in the with-project condition is implausible.

This assumption affects the benefits estimates indirectly, so it is more an issue of principle than of calculation. The analysis would be stronger and more consistent if the assumption of unmet demand were either documented or eliminated.

4. Original Panel Comment*. Container Fleet Assumptions.* The container shipping benefits analysis assumes that the composition of the containership fleet calling Portland will not change with channel deepening. In other words, the same vessels with the same capacities and design drafts will call Portland with or without deepening. Panel members felt that there could be some tendency to use larger vessels if a deeper channel were available, and that there could be some undocumented potential benefits. The Corps assumption that the container fleet changes are the same "with project" and "without project" appears reasonable and conservative within existing Corps analysis. Panel members believe this issue should be analyzed as part of a broader, multi-port context, and subjected to thorough sensitivity analysis.

Review Opinion. The Corps' container fleet analysis has been extensively revised to reflect the influx of larger vessels, and the panel members no longer have significant concerns.

5. Original Panel Comment*. Loaded vs. Empty Container Traffic.* The Corps assumed that loaded and empty container traffic would grow in parallel, retaining the existing proportions on Portland vessels. It is almost certain that the ratio of empties to loads would change, but the extent to which it would change and the impact on the benefits estimate is unclear. Should the carriers decide to use additional vessel cube (space) capacity to reposition a higher proportion of empty containers to Asia, the benefits (based on vessel sailing draft) may be smaller than if the increased vessel utilization based on sailing draft were attributable to loaded containers. At a minimum, this assumption, a well as the designation of "full vessels" based on sailing draft and or cargo space needs to be verified and the sensitivity of the benefits analysis to changes in the ratio of loaded and empty containers needs to be tested. This is another potential application of the multi-port analysis.

Review Opinion. Treatment of empty containers is still troublesome, although the impact on benefits estimates may be minimal.

The Corps assumed that the ratio of empties to loads would not change with a deeper channel. This assumption is incompatible with the assumption of no cargo growth unless it is also assumed that the carriers will reduce frequency. Otherwise, with no additional cargo, the carriers could not use the added capacity resulting from greater departure drafts.

The revised economic analysis also offers the following scenarios on page 47.

- ***"Empties increase as a percentage in both with- and without-project conditions.*** *The benefits of the project increase in this case, as the total voyage costs are spread over less cargo in both conditions".*
- ***"Empties decrease as a percentage in both with- and without-project conditions.*** *The benefits of the project decrease in this case, as the total voyage* costs are spread over more cargo."

The panel could not support this line of reasoning. Although there may be more or less *revenue* cargo, the empty containers are still cargo that the ocean carrier must move.

- ***"Empties decrease as a percentage in the with-project condition.*** *The benefits of the project increase in this case. This case essentially assumes that the average vessel cubes out in the without-project condition, and that full containers in the with-project condition displace empties."*

With the Corps no-growth assumption, this is not possible unless service frequency is cut to bring overall capacity *below* the current level.

- ***"Empties increase as a percentage in the with-project condition.*** *The benefits of the project decrease in this case, representing a scenario in which carriers choose to use the additional capacity created by channel deepening to load more empties rather than fulls".*

This is the *only* possibility if capacity increases while cargo remains constant. The presumption that this scenario reduces benefits, however, ignores the vessel operators' interest in carrying empties at the lowest possible cost.

Although the panel recognizes the Corps' efforts to examine the implications of different empty/load scenarios, the scenarios do not resolve the issue.

The difficulty stems from the Corps' focus on net tons (cargo) rather than the number of total units (TEU, loaded and empty) that the carrier must move in its ongoing operations. Carriers must move empties back to Asia to remain in business. If they respond to greater depth by carrying more loads, they still must incur the cost of moving empties some other way.

- If the vessels are departing full in the without-project condition (cubed-out, regardless of draft), replacing empties with additional loads in the with-project condition (violating the no-growth assumption) increases carrier revenue but may not result in any scale economies since vessel utilization has not actually changed.
- If the vessels are not full in the without-project condition (e.g. have empty slots despite reaching target draft), additional capacity for empties in the with-project condition is an uncounted concrete benefit, even without cargo growth.

Table 39 on page 47 of the revised analysis attempts to relate the percentage of empties to the total container benefits using alternate assumptions for total tare. The approach, however, is misleading, since the "container benefits" appear to be allocated only to loaded containers (to tons of cargo, in fact) while the number of containers carried - and benefiting from additional capacity - includes the empties as well.

6. Original Panel Comment. *Carrier Market Entry and Exit.* The Corps assumed that the supply of container vessel capacity was limited only by channel depth, ignoring potential carrier entry and exit calling directly at Portland. While this may be reasonable under standard NED analysis guidelines, this approach creates an incomplete picture. Individual ocean carriers and carrier alliances have repeatedly entered and exited the

direct Portland market over the last two decades. At the time of the review, one major carrier (Evergreen) had recently exited, leaving two alliances serving Portland directly and other carriers serving the same market indirectly over Tacoma or Seattle. Another carrier alliance was expected to begin direct Portland calls in August of 2002. The estimate of transportation cost savings rests on increased utilization of a fixed fleet of vessels calling Portland. Entry of another carrier with additional direct calls that spread the available cargo among more vessels could theoretically negate most of the benefits assuming that the cargo volume is fixed. The existing analysis does not capture this level of complexity.

Review Opinion. This issue was discussed in the Corps' response document, but has not been resolved. The Corps' response makes reference to longer or shorter adjustment periods, but the adjustment period is not at issue. The response argues that the Portland market would not become "over-tonnaged", but in reality the market will always be served by either more capacity or less capacity than the exact volume of cargo would require, if only because the volume varies in the course of the year and vessel capacity is not subject to fine adjustments. The analysis is still left with a persistent dilemma:

- If container vessel operators respond to greater channel depth by concentrating the same cargo on fewer and larger vessels with greater departure depths to gain scale economies, Portland service frequency will fall to the detriment of customers and the Port's competitive position.
- If vessel operators maintain service frequency to satisfy customers, they will forego the scale economies and the estimated benefits because the fixed available cargo will still move on the same vessels. This is particularly true because the analysis awards benefits only to loaded containers (to tons of cargo). Moreover, if a new vessel operator begins to call Portland due to the greater depth and adds vessel capacity, the scale economies and estimated project benefits would be dissipated because vessel utilization will drop, even though customers would benefit from additional service options and competition.

In short, the assumption of no cargo growth leads to a situation were benefits can only be obtained at the cost of diminished service. This dilemma has not been resolved in the revised estimates analysis.

7. Original Panel Comment. *Service Implications of Fewer Vessel Calls.* Since it was assumed that neither the cargo volume nor the vessel fleet would change with channel deepening, the transportation cost reductions would necessarily come from greater utilization of existing vessel capacity and fewer vessel calls. Vessel frequency, however, is a major factor in the decision of shippers to route cargo through a given port. Other things being equal, reduced vessel calls would tend to shift cargo to other ports. The realism of the post-deepening vessel scenarios must therefore be more closely examined (leading to a multi-port analysis).

Review Opinion. The discussion of service implications (p.40) is not adequate, and this issue remains unresolved. The revised estimates analysis dismisses the with-project service problem despite citing the exact same problem as occurring with a previous channel deepening.

"This is the same effect that was observed with the deepening of the channel from 35 feet to 40 feet. While total Columbia River cargo volumes have tripled over the 40 years since the deepening was authorized in 1962, the number of annual commercial marine vessel calls has declined slightly over that same period of time". (page 40)

If anything, the revelation that service frequency fell following a previous channel project is strong evidence that the problem should be taken seriously. The revised benefits analysis notes that it is "unlikely that the additional capacity created by channel improvement would result in existing carriers deciding to discontinue Portland service". The panel agrees. It is, however, possible and even likely that carriers may combine calls (in vessel sharing agreements or alliances), skip some Portland calls, or reduce frequency (from weekly to ten days, for example). The revised analysis actually appears self-contradictory:

- *"In the long-term, it is likely that the greater utilization of the larger container vessels would have the effect of reducing the overall number of vessel calls to the Columbia River as cargo volumes increase over time."*
- *"However, it seems unlikely that deepening the channel will have a negative impact on Portland service frequency…"*

Since the analysis assumes no cargo growth, it is necessary to reduce frequency to obtain the benefits of scale economies and greater vessel utilization.

8. Original Panel Comment. *Forecasts and Cargo Capture.* The Corps's analysis apparently included simplifying assumptions regarding current and future container cargo capture from Portland's hinterland (equivalent to market share). These factors were incorporated as the BST/DRI-WEFA Port of Portland cargo forecasts were applied to the benefits analysis. Some of these factors appear to be judgmental, although the analysis tends to be conservative. These critical judgments should be made explicit, documented, and subjected to explicit sensitivity and risk analyses.

Review Opinion. This issue has been adequately addressed in the revised estimate analysis.

9. Original Panel Comment. *Tons vs. TEU.* As is standard practice, the Corps conducted its analysis of container shipping benefits in short tons. The decisions made by shippers, consignees, and vessel operators are more often made and expressed in TEU (twenty-ft. equivalent units) or container count. The Corps thus applied a cargo weight standard to vessels that are managed by cubic capacity, which may give a distorted picture of vessel capacity utilization. This practice may also obscure the handing of empty containers, which have a tare weight but not net shipment weight. There may be merit in a parallel analysis expressed in TEU.

Review Opinion. This issue concerns analytic procedures rather than results, and did not necessarily require changes to the analysis. The issue of empty versus loaded containers still raises concerns expressed elsewhere.

10. Original Panel Comment. *Light-Loading Vessel Benefits.* Current practice at Portland is for container vessels to depart with drafts of 38-39 ft. Vessels departing at shallower departure drafts (e.g. 36-37 ft.) are referred to as "light-loading" in the absence of cube capacity constraints, as they are not carrying as much tonnage as the present 40-ft. channel would allow. The methodology for vessel cost savings includes benefits from "with project" departure drafts of 38 ft. or less, which is not reasonable. Such departure drafts are available at present, and do not require deepening. Moreover, light-loading vessels using less than the available draft with or without the project are apparently limited by some factor other than channel depth. Benefits would only accrue to vessels now limited by channel depth, those now leaving at departure drafts of 38-39 ft. that could load to 40-42 ft. with deepening.

Review Opinion. The treatment of the light-loading vessels is the most significant remaining problem. The analysis lacks a concrete explanation of why some vessels sail at lesser drafts and how that would or would not change with dredging. The panel remains unconvinced that light-loading vessels would benefit from channel deepening.

The revised analysis discusses the distribution of departure depths and notes that the distribution has shifted toward greater depths over time. The notion of the distribution of sailing drafts "shifting to the right" may be plausible, but is not convincing. Essentially, this concept assumes that vessel operators and stevedores attempt to load each vessel to a target draft, have adequate export cargo to do so, and that their success or failure can be represented statistically. The revised economics analysis appear to argue, in effect, that vessels which are now light-loaded by a given margin below the target draft would be loaded to the same margin less than the new target draft, and would therefore benefit. For example, a vessel now loaded to 37 feet (one foot less than a 38-foot target) in the without-project condition would be loaded to 40 feet (one foot less than a 41-foot target) in the with-project condition. The revised analysis states:

> *"With a three-foot deepening, target drafts increase by three feet, and it can be assumed that operators will meet their new target drafts about as frequently as they do today, given a short period of adjustment." (page 35)*

The review panel does not agree with this statement. The is no documented support for this assertion from carrier or stevedore interviews or other sources. Moreover, this concept appears to rest on the unsupported assertion that the Portland market is undertonnaged and suffers from lack of capacity, thereby implying that there is excess export cargo available to fill every vessel to the target draft. This issue is addressed above.

In the absence of a concrete explanation for light-loading, it seems most likely to the panel that light-loading may due either to a shortage of export cargo for a particular voyage (due perhaps to seasonality or fluctuations in the carrier's customer base), or to the need to reposition larger numbers of empty containers back to Asia. These conditions would persist in the with-project condition.

At a bare minimum, there should be a sensitivity analysis to let the reader know how much of the claimed benefits are attributable to light-loading vessels. Such a sensitivity analysis was proposed in the Corps' response document, but does not appear in the revised economics analysis. An informal estimate by a panel member suggests that up to 25% of the container shipping benefits may be attributed to light-loading vessels. While the elimination of light-loading vessel benefits would not be enough by itself to jeopardize project justification, it would narrow the cost-benefit ratio from roughly 1.8 to perhaps 1.5.

11. Original Panel Comment. *Realization of Rate Reductions by Non-Portland Shippers.* As noted elsewhere, the standard interpretation of NED benefits implicitly assumes that transportation cost reductions will result in benefits to US carriers or shippers. Given that the carriers in question are all foreign-owned, the validity of this implicit assumption rests on the translation of carrier cost savings into rate reductions for US customers. This is a particular concern when the NED analysis effectively assumes that carrier operating savings from greater Portland departure depths will result in rate reductions to shippers using *other* ports, specifically Tacoma (the last US port before Portland on outbound trips). More complete analysis (i.e. the "multi-port" analysis) would be required to support these benefits.

Review Opinion. This issue was outside the scope of the Portland District's authority and remains so. As the revised analysis and the separate response document correctly point out, costs rather than rates are the standard for Corps estimates of NED benefits. The question remains, however, as a matter for overall Corps and federal policy.

12. Original Panel Comment. *Impact of Rate Reductions at Other Ports on Portland Cargo Capture.* If improved vessel economics do indeed benefit cargo and shippers at other ports, specifically Tacoma, what is the potential impact on cargo capture from Portland's hinterland? The Corps's analysis assumes no change in cargo flows due to the project, yet improved economics at a competing port such as Tacoma could tend to draw cargo away from Portland.

Review Opinion. This issue was likewise outside the scope of the Portland District's authority and remains so. The broader issue is the distribution of benefits among the affected parties and the chain of logic linking cost, rate, and port competition. Another dilemma is implied: if shipping cargo through Tacoma becomes less expensive due to increased channel depth at Portland, would that not tend to attract more Portland hinterland cargo to Tacoma? Resolving this dilemma is beyond the ordinary scope of the Corps analysis, but the dilemma exists none the less.

13. Original Panel Comment. *Significance of Delay.* Portland is currently the last port of call for vessels outbound to Japan on both alliance services. Given the transit times to Japan of more than a week, a delay of a few hours may have no practical significance. The report also notes that late vessel arrivals could disrupt schedules of connecting intermodal (rail/truck) operations, but such operations do not take place in Japan. While it is true that liner services attempt to adhere closely to scheduled arrivals, it is also true that

a delay of a few hours can almost certainly be made up on the trans-pacific crossing. In these circumstances, the impact of a small delay may be no more than the added cost of fuel for a slightly accelerated vessel speed if the schedule is to be rigidly maintained on an hour basis.

Review Opinion. Table 33 on page 41 of the revised economic analysis demonstrates that container vessel delay benefits are very small (less than 1% of the total benefits), and essentially immaterial in the cost-benefit comparison. The panel has no remaining concerns regarding delay benefits.

14. Original Panel Comment – Bulk Benefits. The potential Columbia River deepening benefits from the existing bulk fleet due to increased utilization and/or reduced delay were reviewed and appear reasonable. The potential Columbia River deepening benefits from the fleet shift to larger bulk vessels under with project conditions (deepening) were reviewed and also appear reasonable. There is a minor concern that the cost of bulk vessel trips should be reviewed as it relates to assumptions about the empty return of these vessels instead of securing other loaded movements in conjunction with repositioning of the vessel for subsequent bulk shipments.

The bulk vessel benefits from increased utilization, reduced delay and larger vessels all appear to be reasonable in conjunction with conservative cargo projections which did not allow for the potential for increased cargo under with project conditions.

Review Opinion. The panel has no significant reservations regarding any of the bulk shipping analysis. There is some concern that the soybean growth rate may be too optimistic, but the soybean benefits are only about 5% of the total benefits. Better documentation of the soybean analysis and a sensitivity analysis would be useful.

Table 32 of the revised appendix shows that total estimated bulk commodity benefits have declined significantly. Given the numerous detailed changes made in the bulk analysis, however, some additional information on which changes had which benefit impacts would improve report clarity.

15. Original Panel Comment – Rate Impacts. The realities of Portland's situation and elements of the analysis itself led panel members to question the validity of NED assumptions as applied to this project. The "with project" scenario may be more conducive to rate rigidity for container vessels, and less conducive to rate reductions for the container trade.

Review Opinion. This issue was outside the scope of the Portland District's authority and remains so. As the revised analysis and the separate response document correctly point out, costs rather than rates are the standard for Corps estimates of NED benefits. The question remains, however, as a matter for overall Corps and federal policy. In this particular application, the claimed benefits for container shipping – improved vessel economics through better utilization – would likely be captured by vessel operators rather

than being passed on as rate reductions. Also in this particular application, the vessel operators are entirely foreign entities, making the issue of greater salience in this project.